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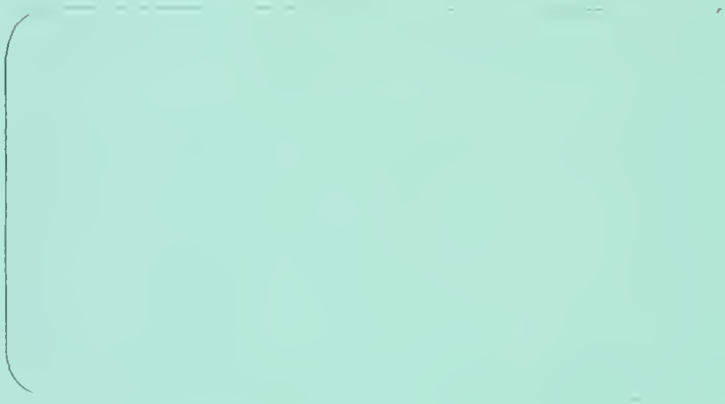
Faculty Working Papers

THE EFFECT OF DUAL LISTING

Frank K. Reilly

#417

College of Commerce and Business Administration
University of Illinois at Urbana-Champaign



FACULTY WORKING PAPERS

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July 8, 1977

THE EFFECT OF DUAL LISTING

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THE EFFECT OF DUAL LISTING*

Frank K. Reilly**

INTRODUCTION

In May, 1910 the American Stock Exchange was officially organized as the New York Curb Market Association. The Association's constitution specifically prohibited members from trading in securities listed on the New York Stock Exchange (NYSE).[1] This prohibition, which became known as the "New York Rule", meant that no stock could be dual listed on the two national exchanges located in New York. If a firm's stock was listed on the ASE and then applied for listing on the NYSE and was accepted, the day it began trading on the NYSE its stock was automatically delisted from the ASE. This practice continued uninterrupted until August 23, 1976, when Varo, Inc. became listed on the NYSE, yet continued to be listed and traded on the ASE. Subsequently four other firms likewise became listed on the NYSE, yet stayed on the ASE. An obvious and interesting question is the effect of this dual listing on the market-making in these stocks.

One could postulate two possible scenarios of what would happen under dual-listing conditions. Notably, the expected effect on price movements would be obviously different. The purpose here is to examine price

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*The author acknowledges the data collection assistance of James Webb, Young Kim, Dave Smith, and Milan Saric.

**Professor of Finance, University of Illinois at Urbana-Champaign.

[1]A full discussion of the history of the American Stock Exchange and its relationship to the NYSE is contained in, Robert W. Doede, "The Monopoly Power of the New York Stock Exchange" (unpublished dissertation, University of Chicago, 1967).

The Effect of Part Time*

Peter C. Reiss**

Abstract

[illegible]

*[illegible]

**[illegible]

movements surrounding the time of the dual-listing to determine any changes in price movements compared to price changes for a sample of ASE stocks that became listed on the NYSE and gave up their listing on the ASE.

The initial section discusses the alternative expectations one might derive for a stock that becomes dual-listed on the two national exchanges. The second section considers prior related studies in this area. In section three, we discuss samples employed and the tests used. The results are presented and discussed in the fourth section. The final section contains a summary and discusses the implications of the results for companies and for capital market efficiency.

ALTERNATIVE EXPECTATIONS

The expected effect of dual-listing is not one-sided. Some who advocate the need for a central auction market would probably argue against dual-listing because it would "fragment" the auction process. In contrast, advocates of competition would welcome dual-listing because it would introduce competing market-makers and generate the usual benefits of competition.

Fragmented Markets Hypothesis

The NYSE has consistently contended that the auction process of buying and selling securities is very efficient and has many desirable characteristics that are of benefit to all participants. At the same time, it is contended that the auction process is very delicate and the auction market can be seriously hampered if it is fragmented by having different market-makers at different locations. Specifically, it is contended that the optimum arrangement requires that all orders come to a central physical location to be entered into the auction process. Only in this way can the

process work effectively.[2] This is basically the reasoning used by the NYSE when arguing for the elimination of the third market through a request for regulation that all listed stocks only be traded on an exchange. This argument against a fragmented market would imply that going from a central auction market on the ASE, to a fragmented auction market split between the ASE and NYSE would result in a poorer market with wider spreads and probably an increase in stock price volatility.

Competitive Market Hypothesis

Those who advocate competitive market-makers argue that competition would foster better markets. Assuming monopolistic market-makers one might expect they could have wider than required spreads in their quotes as a means to increase their returns. The wider spreads would mean greater price volatility over time assuming random orders. With competition, market-makers are forced to improve their quotes or they will not do any business in the stock (e.g., if one market-maker is quoting the stock at 30-31 and a competitor is quoting 30 1/4 - 30 3/4, the market-maker with the smaller spread will do all the business on both sides of the market). While this is obviously an extreme example, it indicates the need for participating market-makers to improve quotations with competition. Therefore, with competition, one might expect smaller quotation spreads and hence lower stock price volatility.[3]

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[2]This line of reasoning has been used to defend the practice of not allowing off-board trading. See, "Big Board Chairman and Team of Brokers Defend Off-Floor Rule," Wall Street Journal, (October 4, 1975); "Restrictions on Off-Floor Market-Making Are Backed by Big Firms in Plea to SEC," Wall Street Journal, (November 29, 1976).

[3]This is the argument made in, Seymour Smidt, "Which Road to an Efficient Stock Market?" Financial Analysts Journal, Vol. 27, No. 5 (September-October, 1971), pp. 18.

PRIOR STUDIES

There are two studies that bear rather directly on the question of this study. The first study by Tinic and West examined factors that influence dealer spreads on the OTC market.[4] One should expect dealer spreads on the OTC to be affected by generally the same variables as spreads for specialist-dealers on an exchange. The interesting segment of the Tinic-West study as related to the current paper is that one of the variables considered was the number of dealers making a market in a given stock. It is pointed out that the expected relationship between spread and number of dealers depends upon the economies of scale in the dealership function. If there are economies of scale in carrying inventories then there should not be a relation between the number of dealers and the spread. In contrast, if there are no economies of scale, then they would expect a negative relationship because of the competitive pressure. Tinic and West hypothesized a negative relation--i.e., more competing dealers, a smaller spread. Their results using data for a single day in 1962 indicated the variable had the expected negative sign, but was not statistically significant because of collinearity beteeen the number of dealers and trading volume. The results using several days data from 1971 indicated the dealer variable had a significant negative coefficient after taking account of volume. The authors conclude:

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[4] Seha M. Tinic and Richard R. West, "Competition and the Pricing of Dealer Service in the Over-the-Counter Stock Market," Journal of Financial and Quantitative Analysis, Vol. 7, No. 3 (June, 1972), pp. 1707-1726.

> However, even though a larger number of dealers prefer to make markets in relatively active issues, competition among dealers tend to reduce bid-ask spreads of all common stocks irrespective of their level of trading activity.[5]

A second study by Reilly and Slaughter considered the effect on the market-making for a sample of stocks listed on the NYSE that were also quoted on the NASDAQ system as part of the third market.[6] Specifically, prior to April 5, 1971, a large number of stocks listed on the NYSE were traded on the third market, but the third market quotations were not readily available. On April 5, 1971, the quotes by OTC dealers in 30 active third market stocks were available on the NASDAQ system. This innovation made it possible to compare the market-making on the OTC to that existing on the NYSE. It also made it possible to examine the short-run effects on the market-making on the NYSE when the NYSE stocks were added to the NASDAQ system--i.e., what effect did the introduction of a visible competitor have?

The analysis of changes in market-making on the NYSE after April 5 considered relative spreads in the closing quotes for the 30 stocks before and after April 5. There was also a comparison of spreads on the NYSE and NASDAQ after April 5th. Finally, there was an examination of daily volatility (High-Low/Low) for the 30 stocks on the NYSE for the 30 trading days before and after NASDAQ.

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[5] Ibid., p. 1720.

[6] Frank K. Reilly and William C. Slaughter, "The Effect of Dual Markets on Common Stock Market-Making," Journal of Financial and Quantitative Analysis, Vol. 8, No. 2 (March, 1973), pp. 167-182.

The results indicated no significant change in the average percent spread before and after April 5. Regarding the change in intra-day volatility, the 30 dual-listed stocks experienced a larger decline in volatility than a randomly selected sample of stocks on the NYSE, but neither of the declines were statistically significant. The authors concluded:

> Overall, it appears that the inclusion of these 30 stocks on the NASDAQ system did not affect their volatility on the NYSE.[7]

In summary, these prior results would tend to support the competitive hypothesis. Specifically, the Tinic-West results indicate that an increase in the number of dealers causes a decline in the spread and, therefore, one would expect a decline in price volatility. The Reilly-Slaughter results that indicated no change would not support either hypothesis. It was pointed out that the no change results could be caused by the fact that the inclusion on NASDAQ of these very active third-market stocks did not have any further effect on markets that already were very competitive.

DATA AND TESTS

Sample

Since Varo, Inc., became dual-listed, four other companies became listed on the NYSE but retained their listing on the ASE. Therefore, as of the end of 1976, there were five companies that were dual-listed. These five companies and the dates they became dual-listed are contained in Table 1. Any analysis of the effect of dual-listing must consider the objection that the analysis could be biased because the market-making on the NYSE is superior due to the greater resources of the NYSE specialists

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[7] Ibid., p. 178.

decidedly [illegible] authors concluded:

[illegible] 30 [illegible] NCSE;

[illegible] by the NCSE, but neither of the [illegible] regarding the change in [illegible]

[illegible] by the [illegible] a larger decline in [illegible]

[illegible] to the [illegible] in the NCSE only [illegible]

[illegible]

and the larger membership on the NYSE. Therefore, we considered a control sample of stocks that had become listed on the NYSE, but did delist from the ASE. Three of the control non-dual listed companies switched before Varo, Inc. while two of the companies made the change after Varo, Inc. The non-dual companies and the dates of the change are also included in Table 1.

Tests

Given a desire to examine the effect of dual-listing on market-making in the stock's involved, the ideal analysis would involve an examination of the quotation spreads before and after the dual-listing for the sample stocks. These data are not available on a daily basis.

What is available is an intra-day measure of volatility that should be influenced by the liquidity of the stock-namely the high and low price for each day. Therefore, for each day surrounding the dual-listing (or change in listing for the non-dual firms) we computed the ratio: high price minus low price/low price. This is the daily range divided by the low price for the day to derive a normalized range value. One would expect this ratio to reflect the market-making for a given stock--i.e., a change in liquidity should be reflected in a change in the spread for the stock and also the relative trading range. Specifically, a stock with a smaller percent spread should also have a smaller range of trading on a daily basis all else equal.

As with almost any time series analysis that covers different periods for alternative members of the sample, it is necessary to adjust the ratio for market effects. To adjust the stock ratios, we derived a comparable daily normalized range value for the aggregate market and subtracted this value from the value for the individual stock. The daily market ratio is

computed using the high and low value for the Dow Jones Industrial Average (DJIA). This market ratio is somewhat biased because it is the ultimate high and low--i.e., the daily high value for the DJIA is derived by taking the individual high prices for each of the 30 stocks that are included in the DJIA and compute the average; the low is the individual low values, etc. The point is, the computed high and low values are not averages that ever existed during the day, but are the potentially highest and lowest values that could have been derived if all the stocks hit their high and low points at the same moment in time. As such, it is a somewhat biased estimate of the market range. Because the bias is consistent over time it should not have an effect on the results. It is mentioned because in some cases the "net" normalized range value for given stocks is negative--i.e., the market's percent range was larger than the stock's range. These negative market-adjusted range values can partially be explained by the computation of the market's range ratio.

Finally, the daily range figure is quite volatile, even after it is adjusted for the market. Therefore, we used a moving average to smooth the series in order to aid the visual analysis of the series. A five day moving average was employed. Even with the moving average the series appears to be quite volatile.

Time Period

The moving average, market-adjusted range series was derived for each of the ten stocks for 30 trading days prior to the dual-listing (or switch from the ASE to the NYSE). The prior period should encompass a period before any announcement of the change and also allow some consideration of what happens just prior to a change. The analysis considered 45 trading

days after the dual-listing (or switch). A preliminary analysis considered 30 trading days after the change but the results seemed to indicate that the series had not settled down within this period. Hence, the total period of analysis for each stock extended from 30 trading days before the change to 45 trading days after the change.

PRESENTATION OF RESULTS

The discussion of results considers the 12 graphs--one for each of the individual stocks and a graph of the average for the five dual-listed stocks and an average for the five non-dual-listed stocks. Also the average results for various time intervals surrounding the change are contained in Table 2 and are considered. Within each subsection we briefly consider each of the individual stocks and then the average results.

Dual-Listed Stocks

Prior to the change to dual-listing the market-adjusted daily hi-lo range for Varo (Figure 1) was generally between 2.5 and 3.5 percent and averaged 3 percent for the prior 30 days. Notably, immediately after the dual-listing the range declined substantially to about .5 percent on the tenth day and averaged only 1.6 percent for the first 20 days after dual-listing. This is obviously a very impressive effect and would indicate a significant effect of competition in connection with this change. Unfortunately, the range began to increase and actually had several very large ranges between day 23 and 30. This range settled down to between 2.0 and 2.5 percent by the end of the test period (it averaged 2.33 percent the last 15 days). While the ending range was below the range prior to the dual-listing, the trend was clearly up after the initial sharp decline.

The ELT, Inc. graph (Figure 2) shows an unusual pattern in that the range declined before the dual-listing and actually experienced some increase in the range immediately after the dual-listing. Subsequently, there was a decline and low values from day 13 through day 32, then another increase, and finally a decline. While the average for the 30 days after was lower than the 30 days before, given the increase near the end, it is difficult to suggest a trend in either direction following the dual-listing.

Frigitronics (Figure 3) probably presents the most impressive case for dual-listing. Prior to dual-listing the range was from 2 to 6 percent and averaged over 3 percent. Within a few days after dual-listing the market-adjusted hi-lo range declined to almost zero and remained there until day 35 such that the average for the first 30 days was only .37 percent. After day 35 the range started to increase up to about 1.5 percent. Even with the increase the average value during the last 15 days was only .87 percent which was below any of the values prior to dual-listing.

The Gearhart-Owens chart (Figure 4) is somewhat similar to Varo in that there was a distinct decline in the market-adjusted range immediately after the dual-listing (the average for days 1-10 was .61 percent compared to 2.0 percent before dual-listing). This was followed by several increases and declines, but the general trend of the cycles was upward such that the average range for the final 15 days was above the average ranges prior to dual-listing.

The final dual-listed graph for Sambo's Restaurants (Figure 5) is probably the most discouraging example of the effects of dual-listing. Except for an increase just prior to the dual-listing, the market-adjusted

range for Sambo's was quite low indicating a very good market on the ASE (the average for the 30 days was only .58 percent). Immediately after the dual-listing, the range returned to the low values experienced prior to the dual-listing (the average for the first 10 days was .66 percent). Subsequently the range increased sharply to over 2.5 percent followed by another decline and ending with a steady increase to the 2.0-2.5 percent level with an average of 1.92 percent the last 15 days. Clearly the average experience after the dual-listing was not as good as the experience before dual-listing.

The average results for the five dual-listed stocks are contained in Figure 6. The average results in Table 2 tend to support the competitive market hypothesis and yet they are also consistent with some indications of increasing ranges toward the end of the test period.

Specifically, the average results are quite encouraging since all the average values for time intervals after the dual-listing are smaller than any of the averages for time intervals before the dual-listing. The average for the first 20 days following dual-listing was about half any of the pre-listing averages. At the same time, the results at the end of the test period were not supportive because of the clear upward trend in the range such that the average values for the final 15 days was 1.68 percent.

Non-Dual-Listed Stocks

The graph for Craig (Figure 7) demonstrates the high volatility in the range figures--even though they are five day moving averages. There was a large decline right after the change in listing, followed by an

increase, another decline and another increase. Overall, it appears the after-change ranges were very volatile, but clearly lower on average.

The Fabricenter graph (Figure 8) was encouraging to the NYSE market shortly after the change, but eventually daily prices became more volatile and the range increased substantially. Specifically, immediately after the change the market-adjusted range declined fairly steadily to a negative value between days 15 and 20 such that the average for the first 20 days was only .35 percent. This was a very impressive performance. In contrast, by the end of the test period the range had increased to a point above any of the values recorded prior to the change in listing. This is evident in the average for the last 15 days of 1.45 percent which was larger than any other average for the company.

The chart for Buttes Gas and Oil (Figure 9) showed a very nice pattern of declines in the ranges prior to the change. Consistent with almost all the charts, there was a general decline for the period immediately after the change. Subsequently, there were two increases with peaks above any peaks prior to the change. At the end of the test period the range was about the same as before the change (1.02 percent for the last 15 days compared to 0.96 percent for the 30 days prior to change).

The chart for Selgiman and Latz (Figure 10) indicated a good market prior to the change and a good but erratic market after the change. Specifically, prior to the change, the market-adjusted range was always less than one-half of 1 percent and on several days the market-adjusted range declined to a negative value. After the change, there was a steady decline to a minus 1 percent, followed by an increase to almost 2 percent and

another decline to negative values. Again, it appears the markets were good after the change based upon negative ranges but also more inconsistant based upon the volatility in the ranges.

The final non-dual stock was Combustion Equipment (Figure 11). The range prior to the change was between .5 and 2.0 percent and averaged about 1 percent. After the change the range actually increased for several days. The range then declined sharply to about zero and ended the test period generally increasing. Overall it appears there was no major change in either direction.

The average for the non-dual traded stocks is contained in Figure 12. Prior to the change, the market-adjusted range varied from about .5 to 1.5 percent and tended to increase prior to the change which might indicate a loss of interest by the ASE specialist. There was a consistent decline in the range during the 30 days after the change indicating close attention by the NYSE specialist to the new stock. Subsequently there was a small increase followed by a decrease and variations around .5 percent prior to an increase during the last week that brought the average to the pre-change level. Overall it appears that the average market-adjusted range for the stocks that did not choose to become dual-listed was about the same after the switch as before. Put another way, the market-making on the NYSE using this rather crude measure was similar to what it had been on the ASE.

SUMMARY AND CONCLUSION

Summary

Since 1910 there has been a "New York Rule" that banned a stock from being listed on both the NYSE and ASE. During 1976 a number of firms with the blessing of the ASE chose to apply for listing on the NYSE, but also decided to retain their listing on the ASE. The purpose of this study has been to examine the impact of this decision on the markets for these stocks. Notably there are differences of opinion as to the potential effect of such a change. On the one hand, advocates of a strong central auction market would expect such a "fragmentation" of the market-making to cause an increase in stock price volatility because all orders would not be coming to one location and, therefore, the market would not be as good. In contrast, advocates of competitive markets would hypothesize a decrease in the market spreads and a decrease in the price volatility. The increased competition was expected to force the specialists to improve their market-making. Two prior studies on the general topic generally supported the expectations of a decline in the spread.

The results for a time series of market-adjusted daily percent price range showed diverse results for the alternative stocks. For the five stocks that were dual-listed, one stock clearly showed a major decline in daily price ranges. After dual-listing, one stock showed a major increase in the daily range, and the other three were mixed. The average results indicated a steady decline for about three weeks after the dual-listing and some variability at a low value. Unfortunately, the final values

started showing a steady increase. Although the overall results indicated a lower level of range, the steady increase during the last 20-25 trading days was quite discouraging.

The results for the stocks that went from the ASE to the NYSE and did not choose to be dual-listed were likewise mixed. For the most part, the range after the change was more volatile, but typically about the same size. These were confirmed by the average results that indicated an increase before the change, a sharp decline after, and a fairly steady pattern.

Conclusion

These results are related to the alternative hypotheses clearly do not support the fragmented market hypothesis because the percent range figures for the dual-listed stocks definitely do not indicate an increase in the average volatility using the hi-lo measure. In fact, overall there is a decline in the average market-adjusted range. Regarding the competitive market hypothesis, the results shortly after the dual-listing supported the hypothesis because the percent range declined to a level clearly lower than that which prevailed prior to dual-listing. Unfortunately it is hard to be too enthusiastic about the support because the range began to increase during the end of the test period.

The results for the stocks that did not dual-list were generally consistent with expectations. The market-adjusted range after listing on the NYSE appeared to be similar to the market on the ASE.

TABLE 1

DUAL-LISTED AND NON-DUAL-LISTED COMPANIES
AND DATES OF LISTING ON NEW YORK STOCK EXCHANGE

Dual-Listed		Non-Dual-Listed	
Company	Date	Company	Date
Varo, Inc.	Aug. 23, 1976	Craig	Aug. 2, 1976
ELT, Inc.	Sept. 28, 1976	Fabric-nter	Aug. 4, 1976
Frigitronics	Oct. 1, 1976	Buttes Gas and Oil	Aug. 12, 1976
Gearha-t-Ow-s Industries	Oct. 5, 1976	Seligman + Latz	Sept. 15, 1976
Sambo's Restaurants, Inc.	Oct. 13, 1976	Combustion Equipment Assoc.	Sept. 22, 1976

TABLE 2

AVERAGE MARKET-ADJUSTED PERCENT
RANGES FOR INTERVALS BEFORE AND AFTER
LISTING ON THE NEW YORK STOCK EXCHANGE

Company	0 to -30	0 to -20	0 to -10	0 to -5	0 to -1	0 to +10	0 to +20	0 to +30	0 to +45	+30 to +45
Varo, Inc.	3.00	3.07	2.82	2.95	2.63	1.90	1.60	2.07	2.15	2.33
ELT, Inc.	.61	.48	.51	-.02	.15	.50	.31	.23	.48	.98
Frigitronics	3.31	3.69	3.07	2.67	2.02	1.55	.69	.37	.54	.87
Gearhart-Owens	1.93	2.00	1.68	1.96	.88	.91	.93	1.05	1.46	2.25
Sambo's Restaurants	.58	.83	1.32	1.83	.93	.66	1.12	1.09	1.35	1.92
Average for Dual-Listed Co's.	1.90	2.04	1.88	1.88	1.32	1.04	.93	.95	1.20	1.68
Craig	1.84	2.07	2.50	1.93	.97	1.16	1.46	1.07	1.22	1.54
Fabricenter	.64	[illegible]	1.[illegible]	1.18	1.51	1.[illegible]	.30	.45	.78	1.45
[illegible] Gas and Oil	.96	.81	.70	.47	1.00	.73	1.23	1.59	1.40	1.02
Seligman and Latz	.07	.15	.35	.36	.46	.04	-.25	-.09	-.15	-.27
Combustion Equipment Assoc.	1.02	1.19	.94	1.05	1.47	1.39	1.36	.98	1.04	1.14
Average for Non-Dual Co's.	.91	.98	1.11	1.00	1.04	.87	.82	.79	.85	.98

FIGURE 1

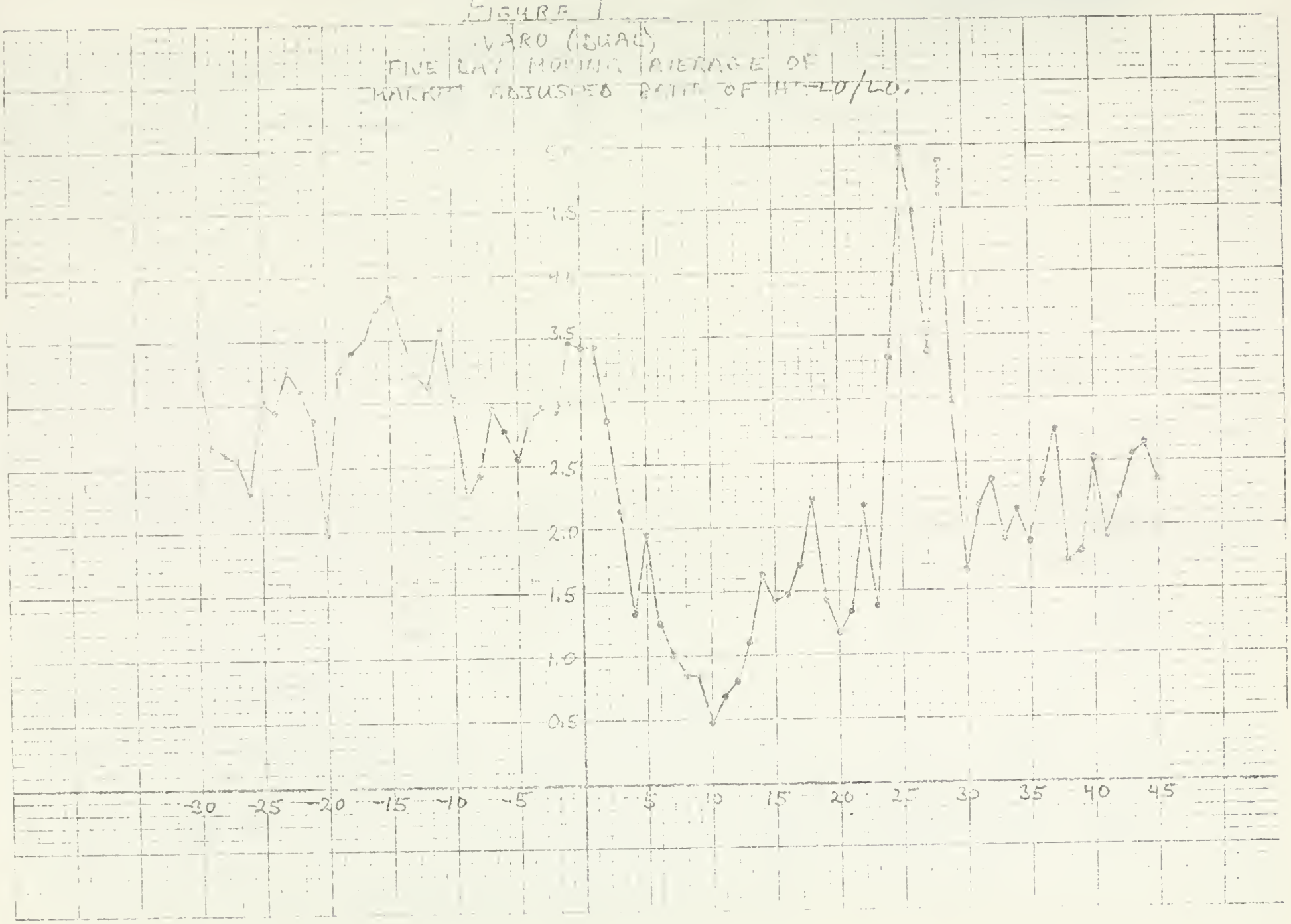

VARO (SUAE)
FIVE DAY MOVING AVERAGE OF
MARKET ADJUSTED RATE OF HI-LO/LO.
3.5
2.5
2.0
1.5
1.0
0.5
-30
-25
-20
-15
-10
-5
5
10
15
20
25
30
35
40
45

FIGURE 2

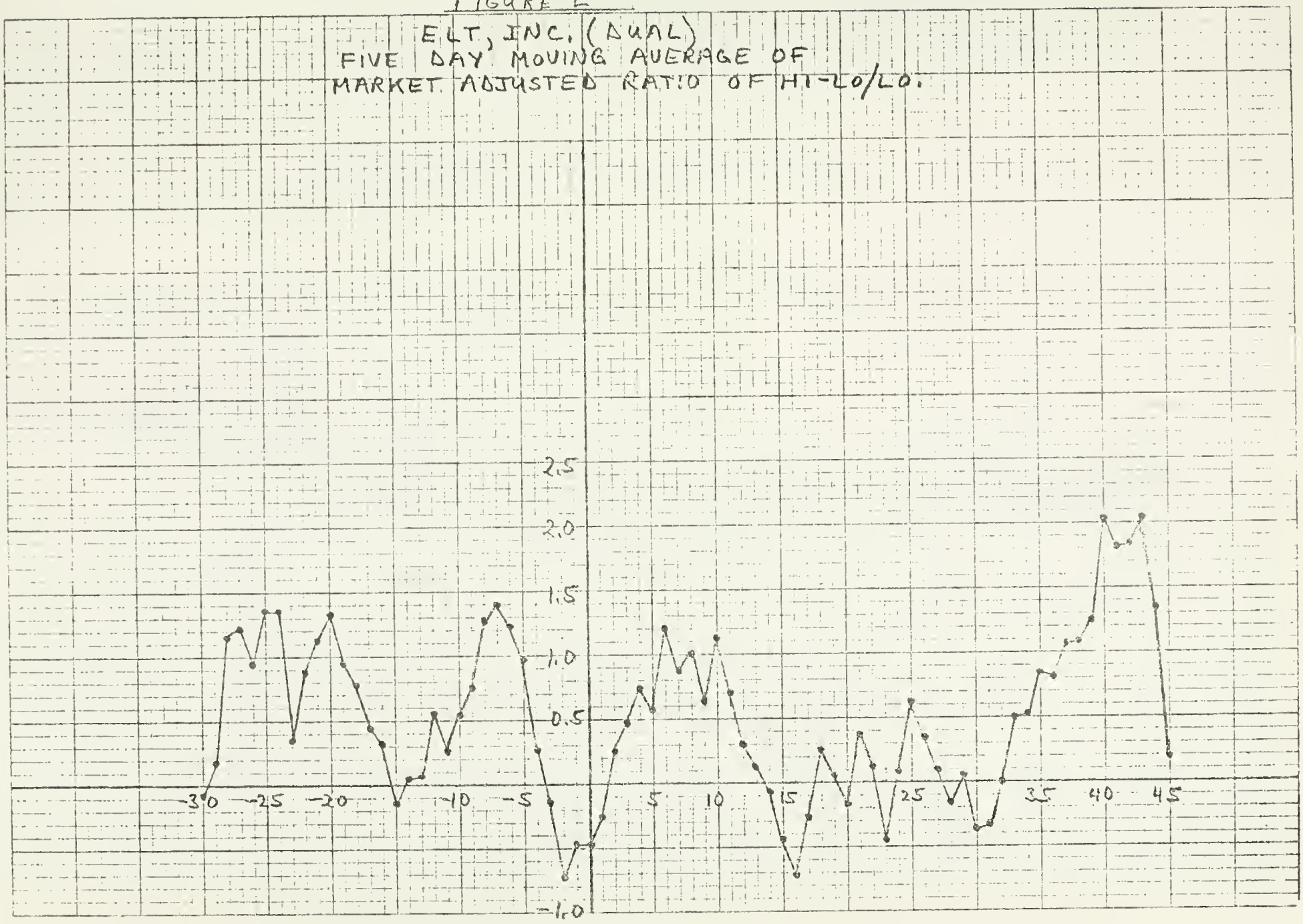

ELT, INC. (DUAL)
FIVE DAY MOVING AVERAGE OF
MARKET ADJUSTED RATIO OF HI-LO/LO.
2.5
2.0
1.5
1.0
0.5
-1.0
-30
-25
-20
-10
-5
5
10
15
25
35
40
45

FIGURE 3

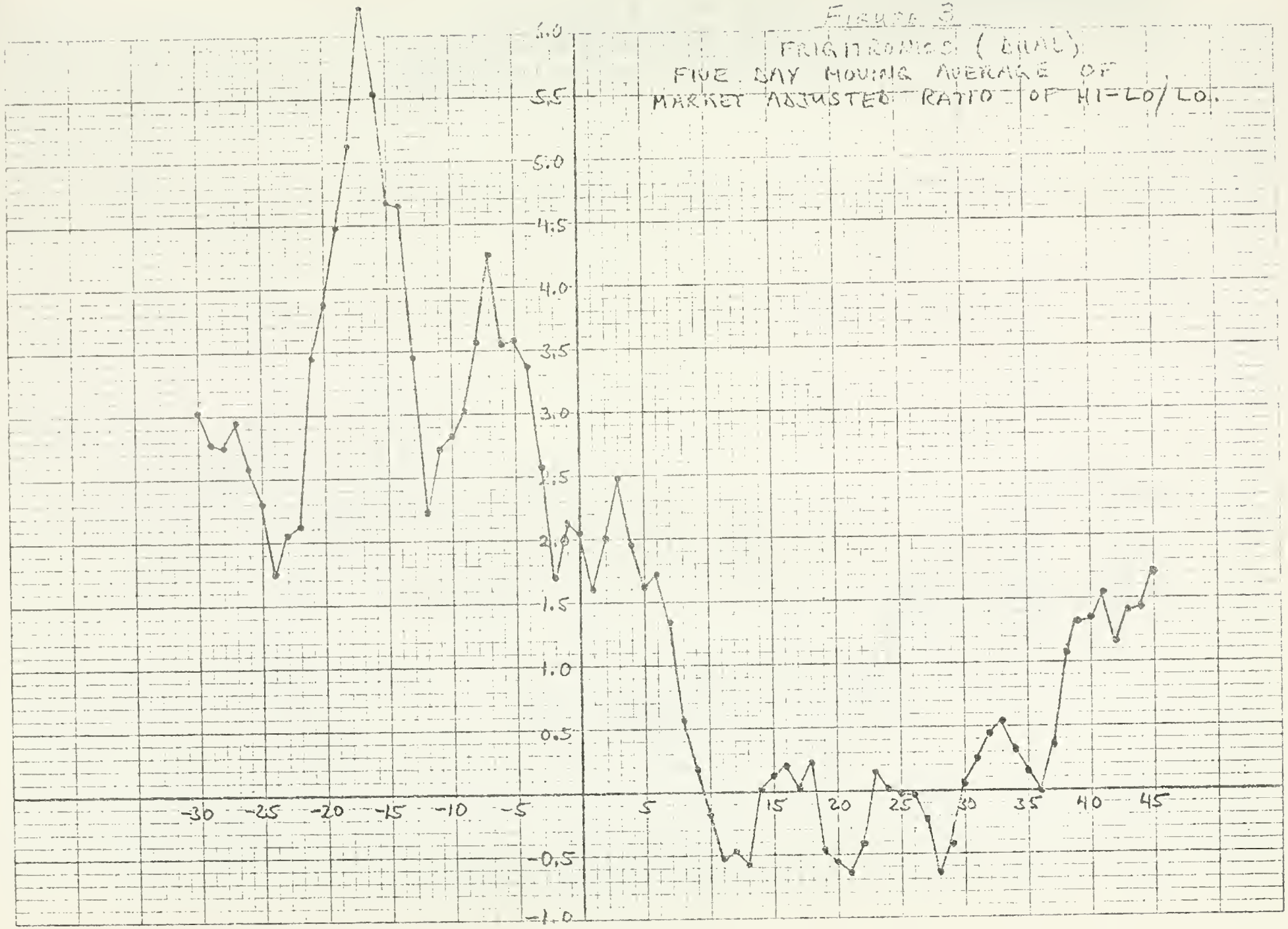
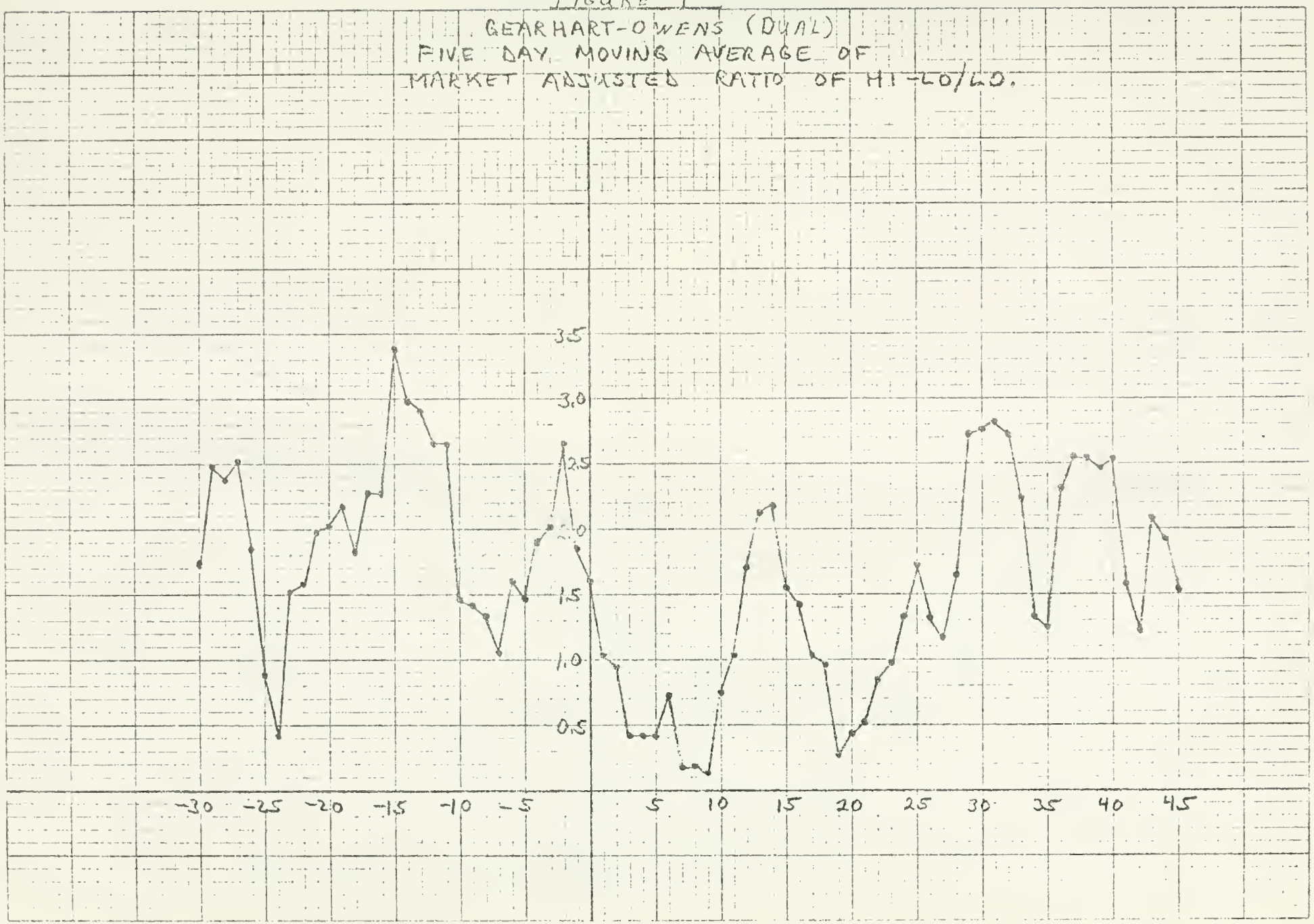

FRIGHTENING (BEAR)
FIVE DAY MOVING AVERAGE OF
MARKET ADJUSTED RATIO OF HI-LO/LO.
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
-0.5
-1.0
-30
-25
-20
-15
-10
-5
5
15
20
25
30
35
40
45

FIGURE 4


GEARHART-OWENS (DUAL)
FIVE DAY MOVING AVERAGE OF
MARKET ADJUSTED RATIO OF HI-LO/LO.
3.5
3.0
2.5
2.0
1.5
1.0
0.5
-30
-25
-20
-15
-10
-5
5
10
15
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25
30
35
40
45

FIGURE 5

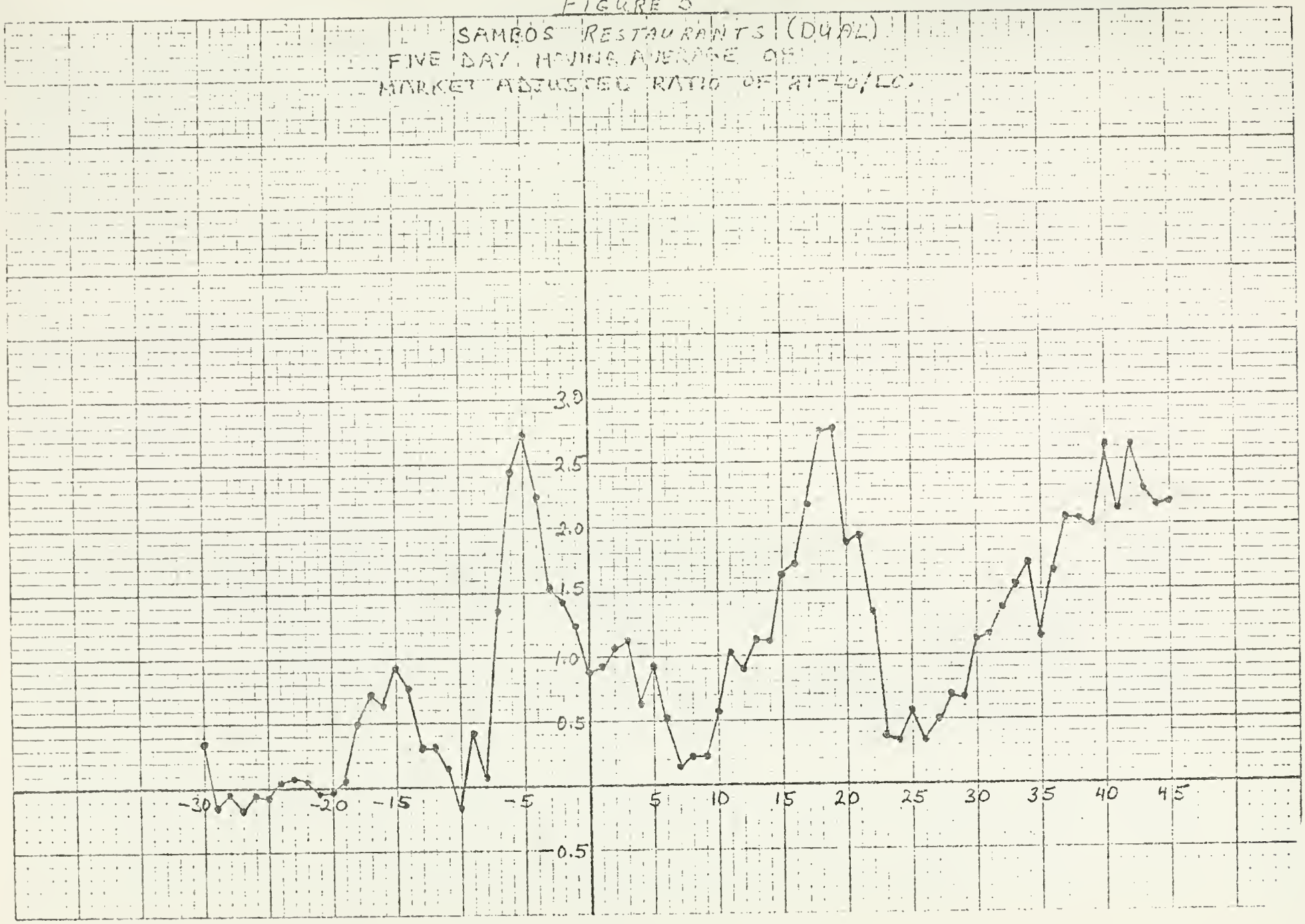

SAMBOS RESTAURANTS (DUAL)
FIVE DAY MOVING AVERAGE OF
MARKET ADJUSTED RATIO OF AT=0/LO.
3.0
2.5
2.0
1.5
1.0
0.5
-0.5
-30
-20
-15
-5
5
10
15
20
25
30
35
40
45

FIGURE 6

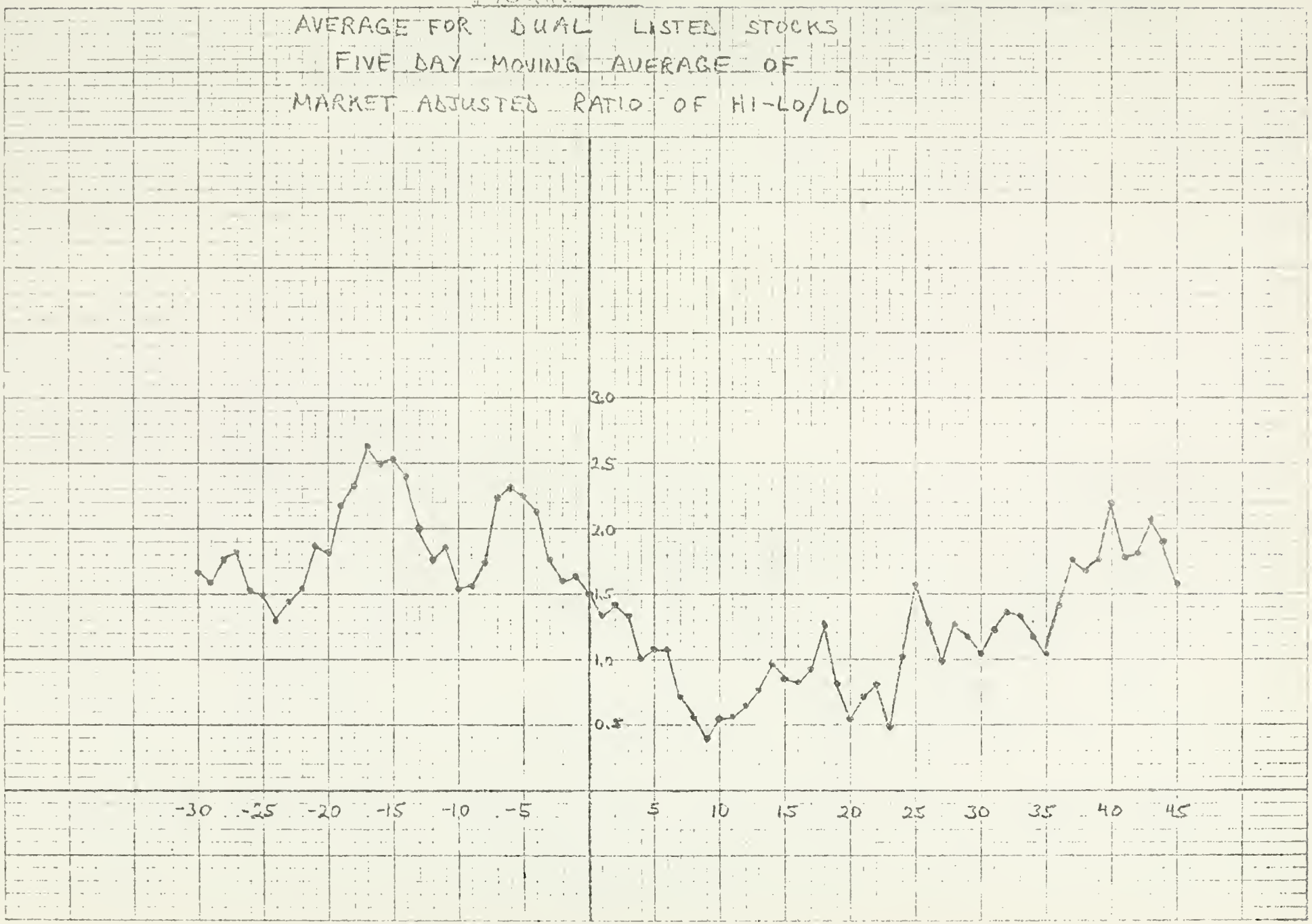

AVERAGE FOR DUAL LISTED STOCKS
FIVE DAY MOVING AVERAGE OF
MARKET ADJUSTED RATIO OF HI-LO/LO
3.0
2.5
2.0
1.5
1.0
0.5
-30
-25
-20
-15
-10
-5
5
10
15
20
25
30
35
40
45

FIGURE 7

CRAIG (NON-DUAL)
FIVE DAY MOVING AVERAGE OF
MARKET ADJUSTED RATIO OF HI-LO/LO.

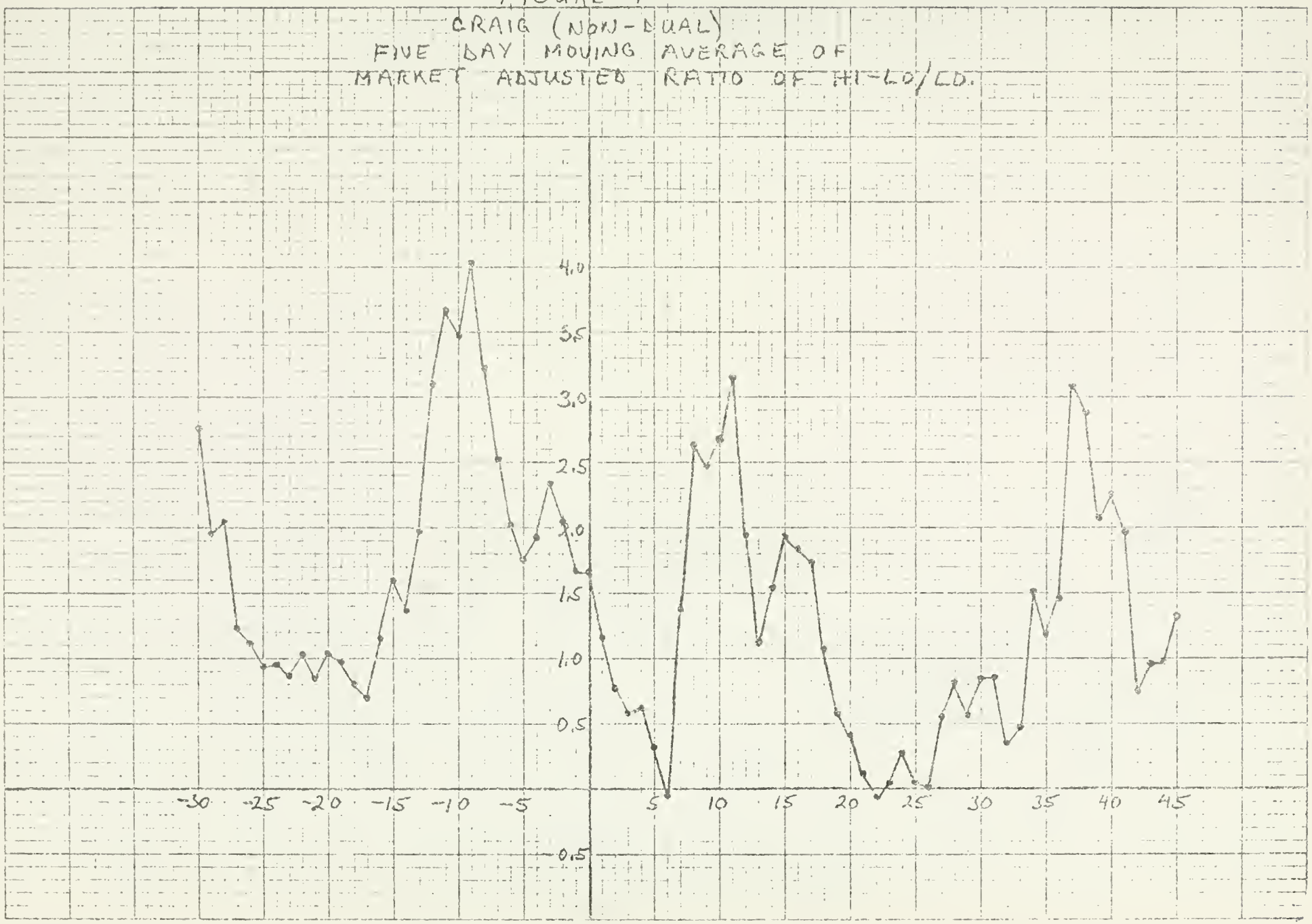


FIGURE 8


FABRICENTER (NOW-DUAL)
FIVE DAY MOVING AVERAGE OF
MARKET ADJUSTED RATIO OF HI-LO/LO.
3.5
3.0
2.5
2.0
1.5
1.0
0.5
-0.5
-1.0
-30
-25
-20
-10
-5
5
10
15
20
25
30
35
40
45

FIGURE 9

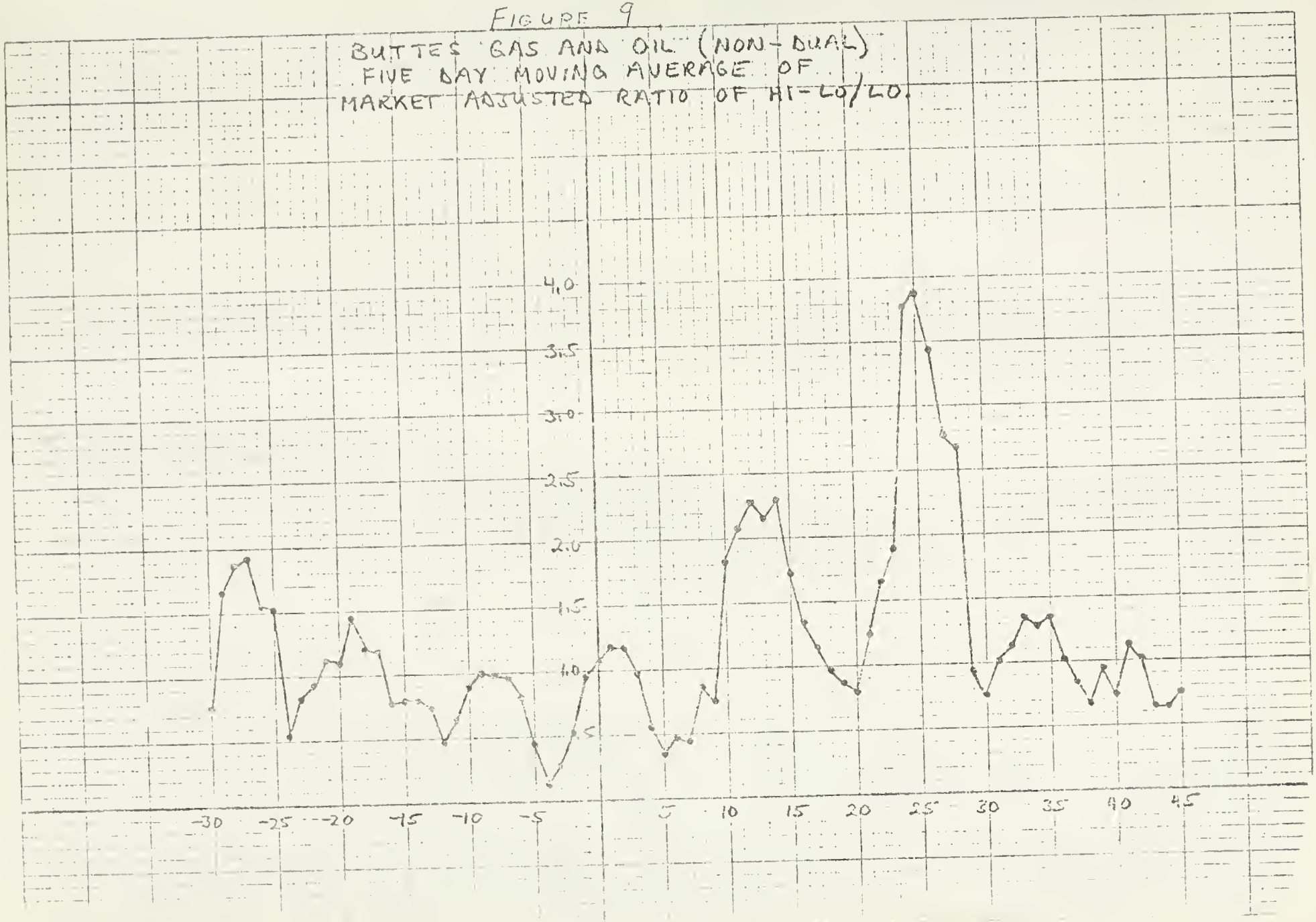

BUTTES GAS AND OIL (NON-DUAL)
FIVE DAY MOVING AVERAGE OF
MARKET ADJUSTED RATIO OF HI-LO/LO.
4.0
3.5
3.0
2.5
2.0
1.5
1.0
.5
-30
-25
-20
-15
-10
-5
5
10
15
20
25
30
35
40
45

FIGURE 10

SELIGMAN AND LATZ (NON-DUAL)
FIVE DAY MOVING AVERAGE OF THE
MARKET ADJUSTED RATIO OF HI-LO/LO.

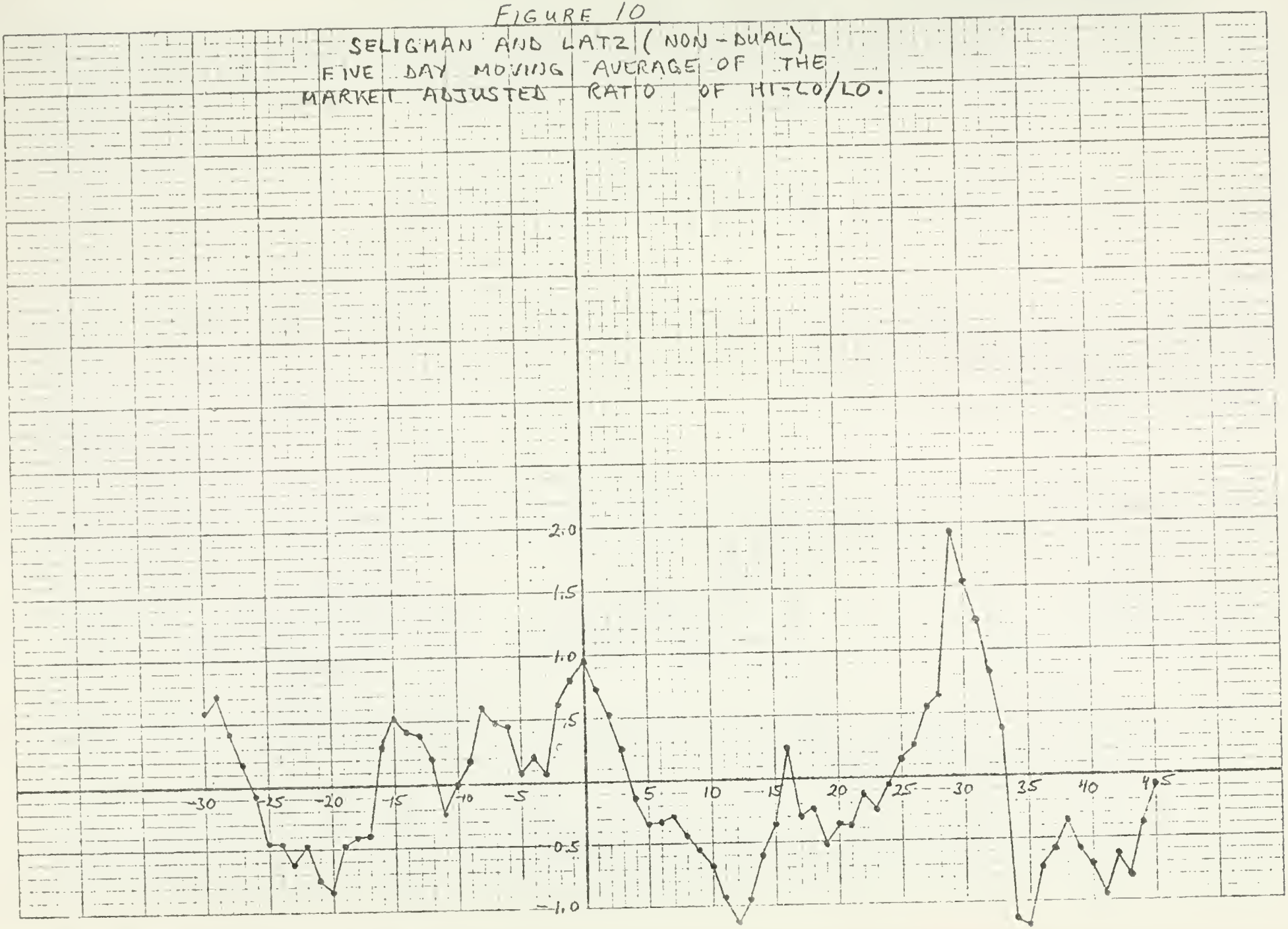


FIGURE 11

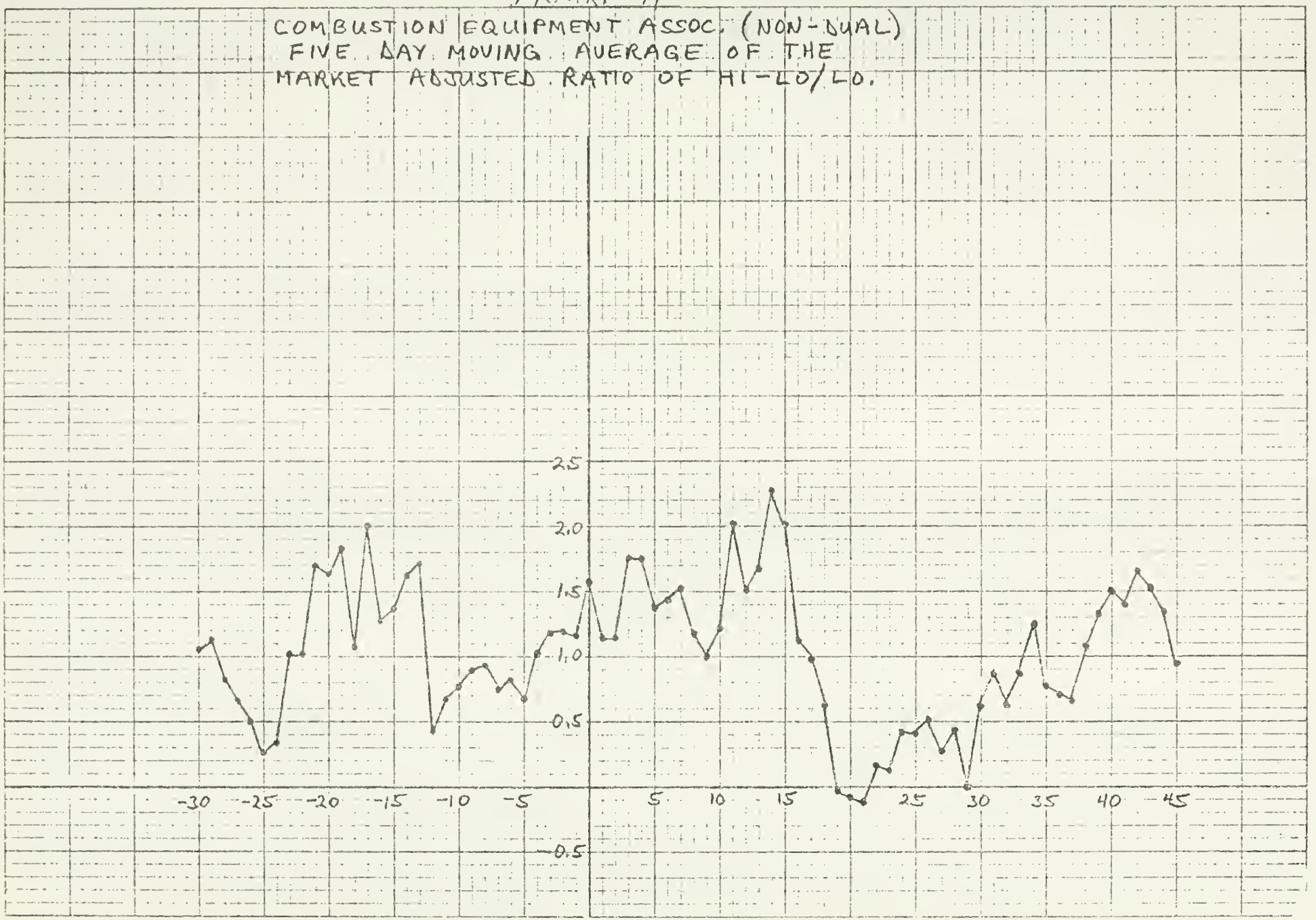
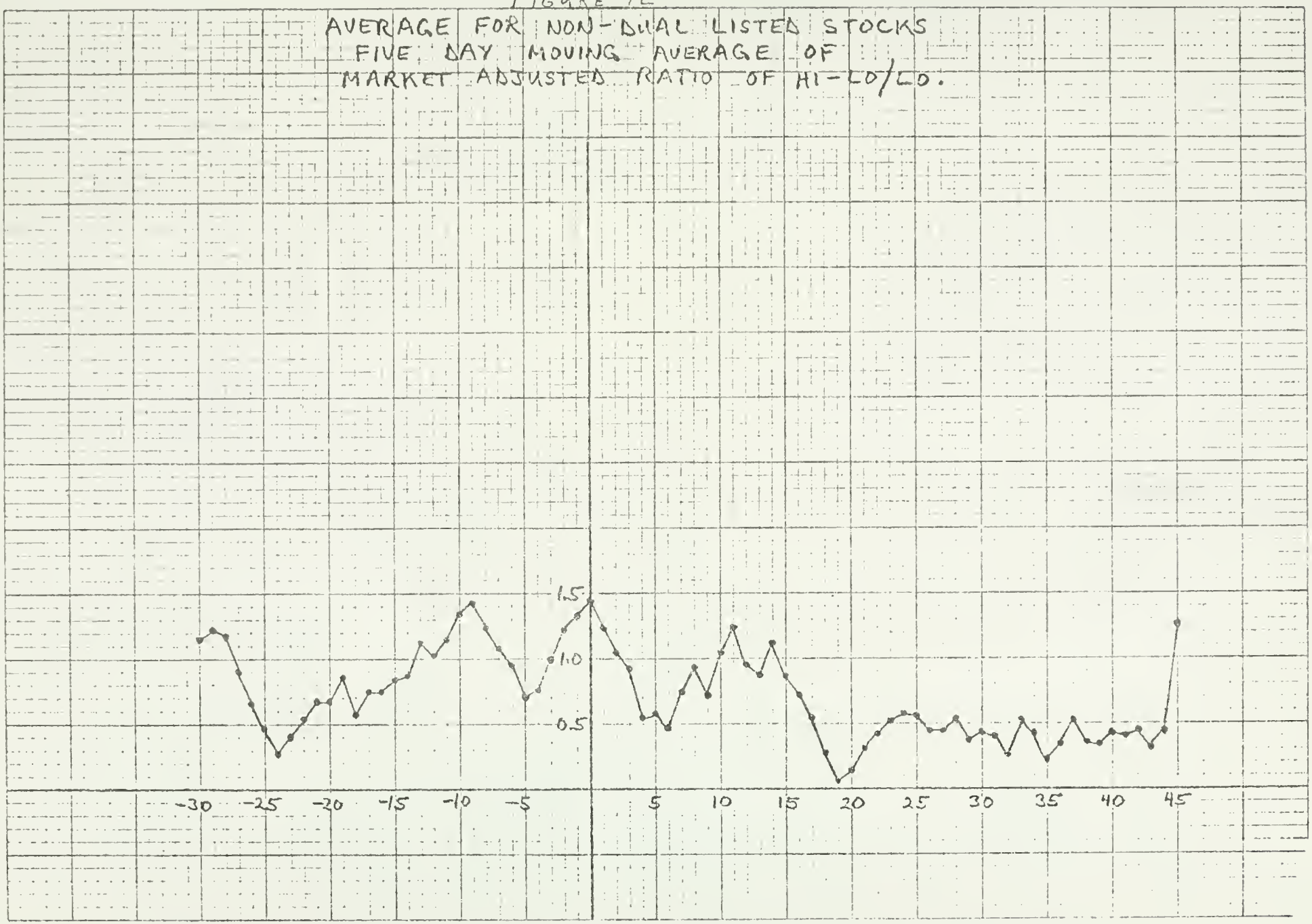

COMBUSTION EQUIPMENT ASSOC. (NON-DUAL)
FIVE DAY MOVING AVERAGE OF THE
MARKET ADJUSTED RATIO OF HI-LO/LO.
2.5
2.0
1.5
1.0
0.5
-0.5
-30
-25
-20
-15
-10
-5
5
10
15
25
30
35
40
45

FIGURE 12

AVERAGE FOR NON-DUAL LISTED STOCKS
FIVE DAY MOVING AVERAGE OF
MARKET ADJUSTED RATIO OF HI-LO/LO.



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